

In the Claims:

Kindly amend claims the claims as follows:

1. (Original) A sensor apparatus for tank volume change, comprising a tank, an optical fiber wound on the tank, the optical fiber having opposite ends exposed for receiving and outputting light energy, and a covering over the optical fiber.
2. (Currently Amended) The apparatus of claim 1, wherein the tank is a cylindrical tank, and wherein the optical fibers ~~are~~ is wound in spaced loops in a first helical direction along the cylindrical tank and subsequently are wound in spaced loops in a second helical direction along the cylindrical tank.
3. (Original) The apparatus of claim 1, wherein the tank is a tank liner, and the covering comprises a filament winding in a filament wound composite gas storage tank.
4. (Original) The apparatus of claim 1, wherein the optical fiber crosses over obstructions and forms bends over the obstructions as the optical fiber is wound on the tank.
5. (Original) The apparatus of claim 4, wherein the optical fiber is wound helically in first spaced coils over the tank in a first direction and is wound helically in second spaced coils over the tank and over the first spaced coils in a second direction, and wherein the first spaced coils form the obstructions and the second spaced coils form the bends where the second spaced coils cross over the first spaced coils as pinch points.
6. (Original) The apparatus of claim 5, wherein the first and second spaced coils are secured to the tank.
7. (Original) The apparatus of claim 5, wherein the bends and the pinch points are secured to the tank with a flexible adhesive.
8. (Original) A method of providing sensors for tank volume changes, comprising:
providing a tank;
providing an optical fiber on the tank;
providing obstructions on the tank;
providing pinch points in the optical fiber by crossing the optical fiber over the obstructions;

securing the entire optical fiber or at least the pinch points to the tank;
providing and exposing ends on the optical fiber for receiving light and outputting light; and
covering the optical fiber and the tank.

9. (Original) The method of claim 8, wherein the providing the tank comprises providing a cylindrical tank liner, wherein the providing an optical fiber and obstructions on the tank comprises winding the optical fiber in first spaced helical convolutions in a first direction along the cylindrical tank liner and winding the optical fiber in second spaced helical convolutions in a second direction along the cylindrical tank liner and forming the pinch points in the second spaced helical convolutions where they cross over the first helical convolutions of the optical fiber.

10. (Original) The method of claim 9, wherein the covering comprises covering the optical fibers with an isolator layer.

11. (Original) The method of claim 10, wherein the covering further comprises providing filament windings over the isolator layer of the optical fiber and over the tank liner for supporting internal pressures within the tank liner.

12. (Original) The method of claim 9, wherein the securing comprises coating the optical fiber with a settable adhesive as the optical fiber is wound on the tank.

13. (Original) The method of claim 9, wherein the securing comprises coating crossover pinch points with a flexible settable adhesive.

14. (Currently Amended) The method of claim 11, further comprising connecting a light source to one end of the optical fiber and connecting a light sensor to the other end of the light-sensor optical fiber, increasing pressure within the tank liner, increasing bending in the pinch points by resisting the increasing pressure with the filament windings, and observing transmitted light attenuation in the light sensor related to expansion of the tank liner and increasing bending of the pinch points.

15. (Currently Amended) Pressure tank apparatus, comprising a tank having an inlet and outlet, an optical fiber secured to an outer surface of the tank and having opposite ends for receiving and

outputting light, the opposite ends being fixed near the inlet and outlet for connecting respectively to a light source and to a light sensor as the tank is filled with gas under pressure, the optical fiber crossing on the outer surface of the tank and forming bends and pinch points at the crossings, and a composite material overwrap covering the optical fiber and for withstanding internal pressure within the tank liner and resisting expansion of the tank liner.

16. (Currently Amended) The apparatus of claim 15, further comprising optical couplings connected to the ends of the fibers and secured to the inlet and outlet of the tank liner.

17. (Currently Amended) The apparatus of claim 15, further comprising thin adhesive connecting the optical fiber to the outer surface of the tank liner.

18. (Previously Presented) The apparatus of claim 17, further comprising a relatively flexible adhesive at the optical fiber bends (pinch points).

19. (Previously Presented) The apparatus of Claim 15, wherein the tank has a geometric shape.

20. (Previously Presented) The apparatus of Claim 19, wherein the geometric shape is selected from cylinders, spheres, double-curves, and combinations thereof.